THAT WHICH IS CLAIMED:

1. A process of forming a resist image in a microelectronic substrate, said process comprising the steps of:

contacting the substrate with a composition first comprising carbon dioxide and a component selected from the group consisting of at least one polymeric precursor, at least one monomer, at least one polymeric material, and mixtures thereof, to deposit the component on the substrate and form a coating thereon; then

imagewise exposing the coating to radiation such that exposed and unexposed coating portions are formed; and then

subjecting the coating to a second composition comprising carbon dioxide having such that either one of the exposed or the unexposed coating portions are removed from the substrate and the other coating portion is developed and remains on the coating to form an image thereon.

2. The process according to Claim 1, wherein the exposed coating portion has a lower solubility in carbon dioxide relative to the unexposed coating portions, and wherein said step of subjecting the coating to a second composition comprising carbon dioxide comprises removing the unexposed coating portion from the substrate such that the exposed developed coating portion remains.

3. The process according to Claim 2, wherein the polymeric material comprises a fluoropolymer.

4. The process according to Claim 3, wherein the fluoropolymer is formed from monomers selected from the group consisting of fluoroacrylate monomers, fluorostyrene monomers, fluoroalkylene oxide monomers, fluorolefin monomers, fluorinated alkyl vinyl ether monomers, cyclic fluorinated monomers, and mixtures thereof.

5. The process according to Claim 4, wherein the monomers are selected from the group consisting of 2-(N-ethylperfluorooctane- sulfonamido) ethyl acrylate, 2-(N-ethylperfluorooctane- sulfonamido) ethyl methacrylate, 2-(N-methylperfluorooctane- sulfonamido) ethyl acrylate, 2-(N-methylperfluorooctane- sulfonamido) ethyl methacrylate, 1,1'-dihydroperfluorooctyl acrylate, 1,1'-dihydroperfluorooctyl methacrylate, 1,1',2,2'-tetrahydroperfluoroalkylacrylate, 1,1',2,2'-tetrahydroperfluoroalkyl-methacrylate, α-fluorostyrene, 2,4,6-trifluoromethylstyrene, hexafluoropropylene oxide, perfluorocyclohexane oxide, tetrafluoroethylene, vinylidine fluoride, chlorotrifluoroethylene, perfluoro(propyl vinyl ether), perfluoro(methyl vinyl ether), 2,2-bis-trifluoromethyl-4,5-difluoro-1,3-dioxole, and mixtures thereof.

6. The process according to Claim 2, wherein the polymeric material comprises a silicon-containing polymer.

7. The process according to Claim 6, wherein the silicon-containing polymer comprises at least one segment selected from the group consisting of an alkyl siloxane, a fluoroalkyl siloxane, a chloroalkyl siloxane, and mixtures thereof.

8. The process according to Claim 2, wherein an intermediate layer is present between the coating portion and the substrate, and said process further comprising the step of selectively etching the intermediate layer using the developed coating portion as an etching mask.

9. The process according to Claim 8, wherein said step of selectively etching the intermediate layer comprises comprises contacting the intermediate layer with a gas selected from the group consisting of oxygen, chlorine, fluorine, and mixtures thereof.

10. The process according to Claim 2, further comprising the steps of:

depositing a metal-containing material or an ionic material on the surface of the substrate from which the exposed or the unexposed coating portions were removed; and then

removing the exposed coating portion from the substrate.

11. The process according to Claim 10, wherein the metal-containing material comprises at least one metal selected from the group consisting of aluminum, copper, gold, titanium, tantalum, tungsten, molybdenum, silver, and alloys thereof.

12. The process according to Claim 10, wherein the ionic material is selected from the group consisting of boron, phosphorous, arsenic, and combinations thereof.

13. The process according to Claim 2, wherein the radiation is selected from the group consisting of visible, ultraviolet, x-ray, and e-beam.

14. The process according to Claim 13, wherein the radiation is ultraviolet or x-ray and the composition comprising polymeric material includes a photo acid generator.

15. The process according to Claim 10, wherein said step of removing the exposed coating portion from the substrate comprises contacting the exposed coating portion with a carbon dioxide containing fluid such that the exposed coating portion is removed from the substrate.

16. The process according to Claim 2, wherein said step of contacting the substrate with a first composition comprising carbon dioxide and a component comprises coating the component using a method selected from the group consisting of a spin coating method, a dip coating method, a